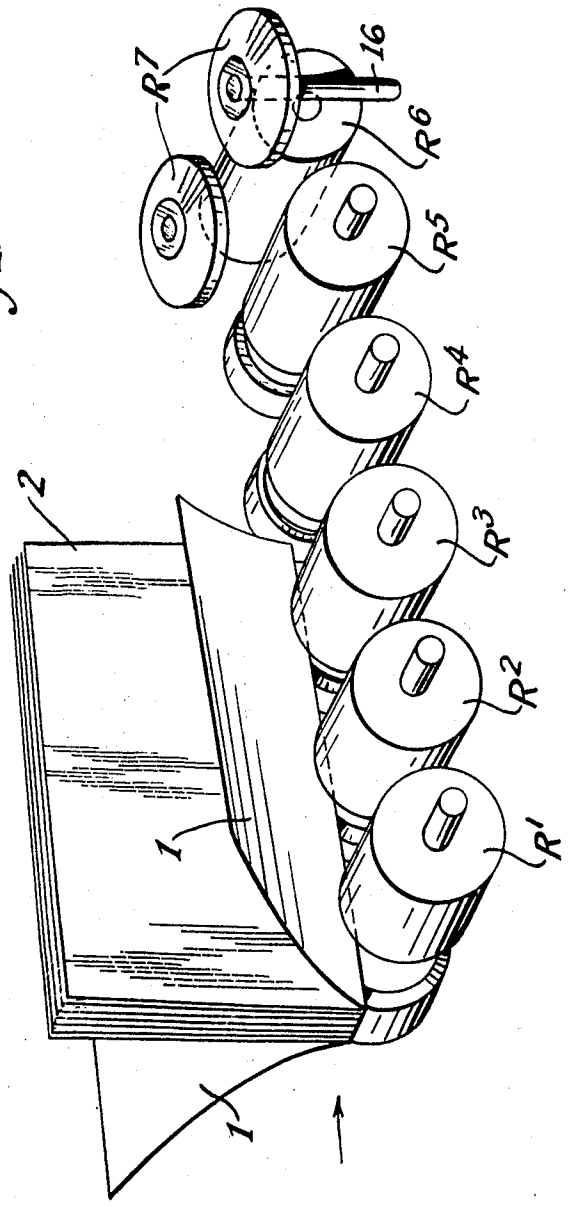
Sept. 16, 1969 L. J. B. R. FRENCH 3,466,682

BOOKBINDING MACHINERY

Filed Oct. 18, 1967 5 Sheets-Sheet 1

Fig. 1.



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BOOKBINDING MACHINERY

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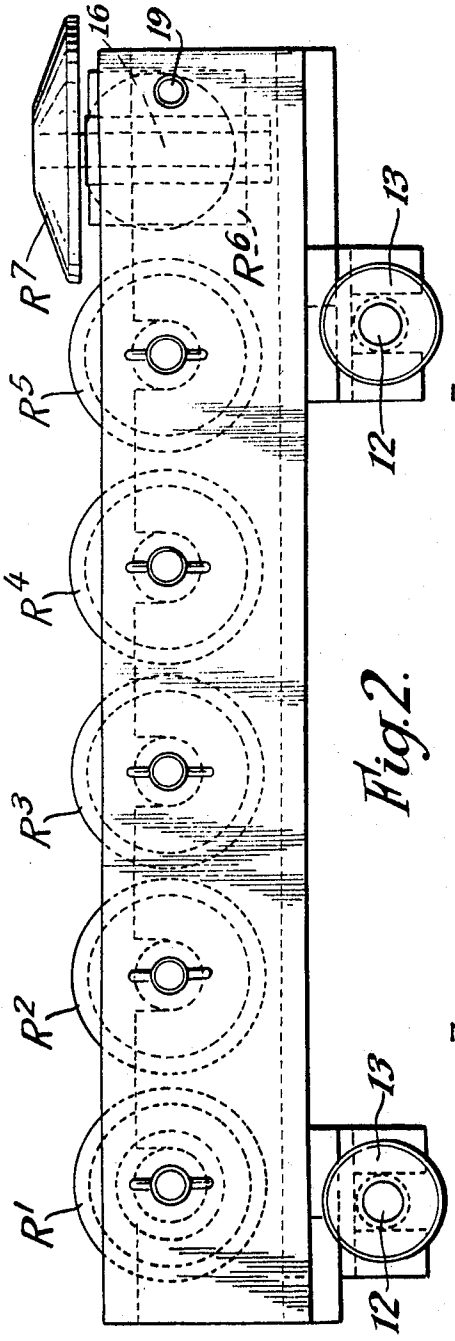


Fig. 2.

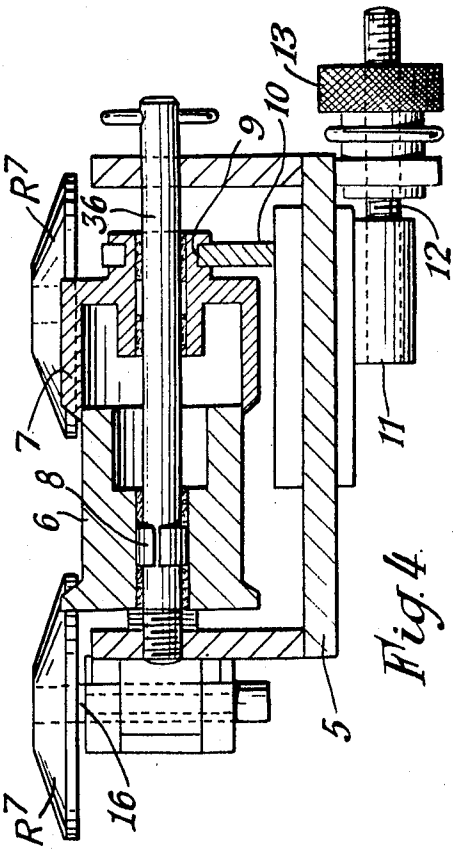


Fig. 4.

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BOOKBINDING MACHINERY

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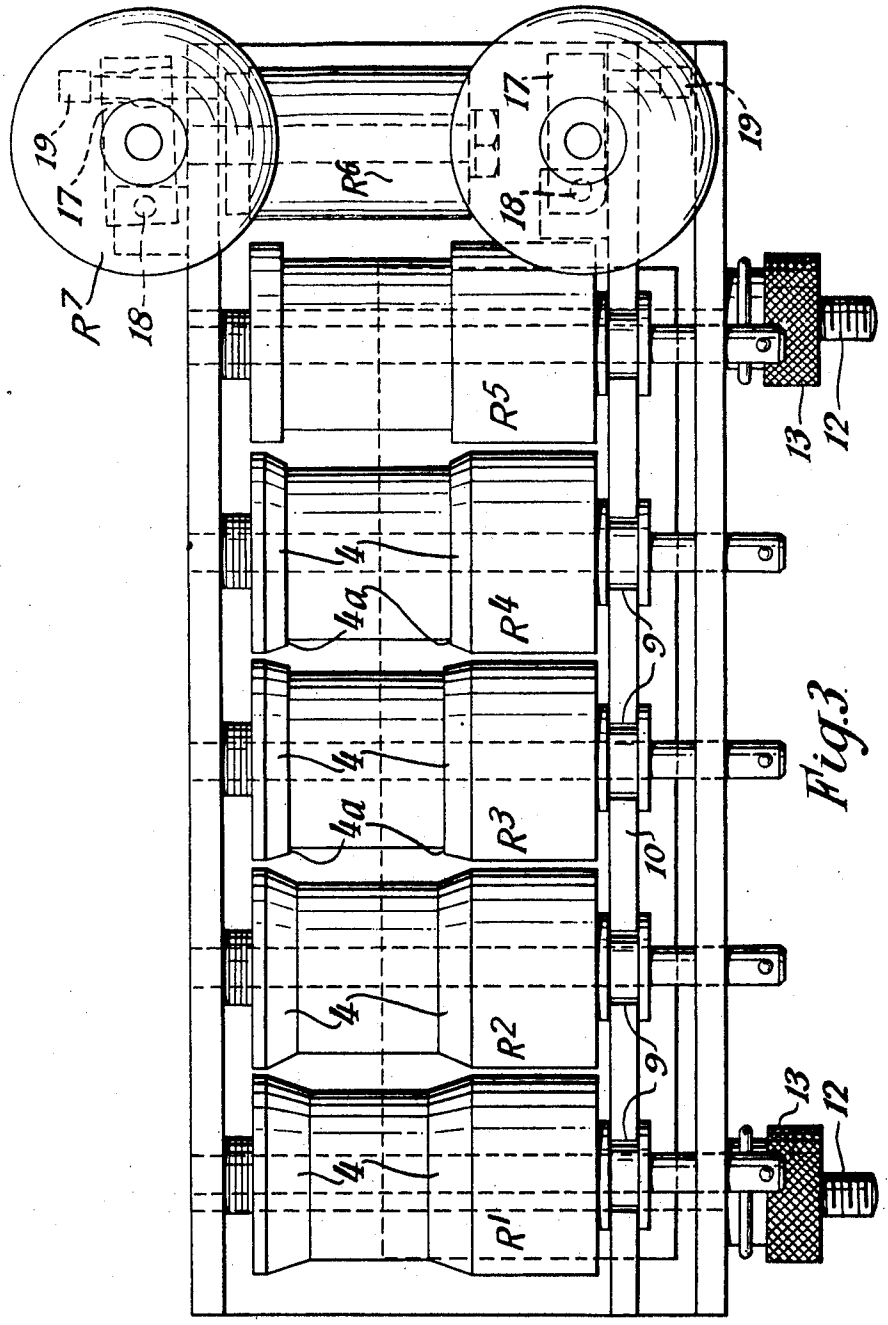


Fig. 3

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BOOKBINDING MACHINERY

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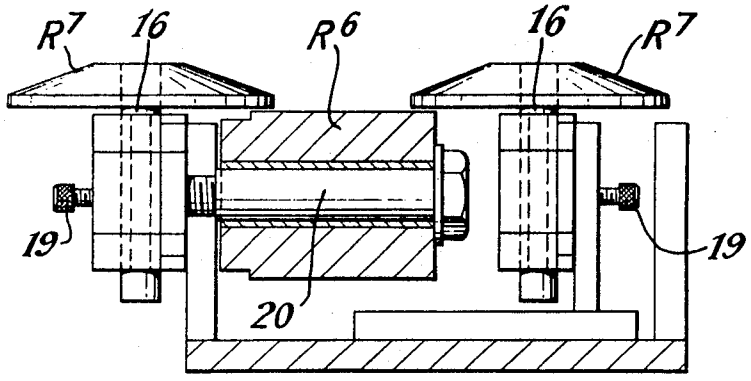


Fig. 5.

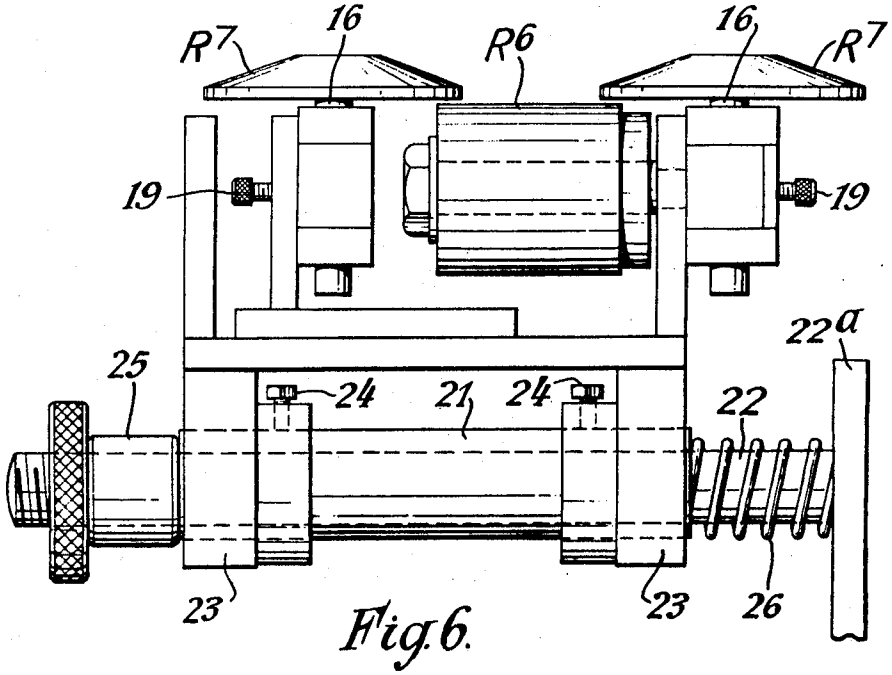


Fig. 6.

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BOOKBINDING MACHINERY

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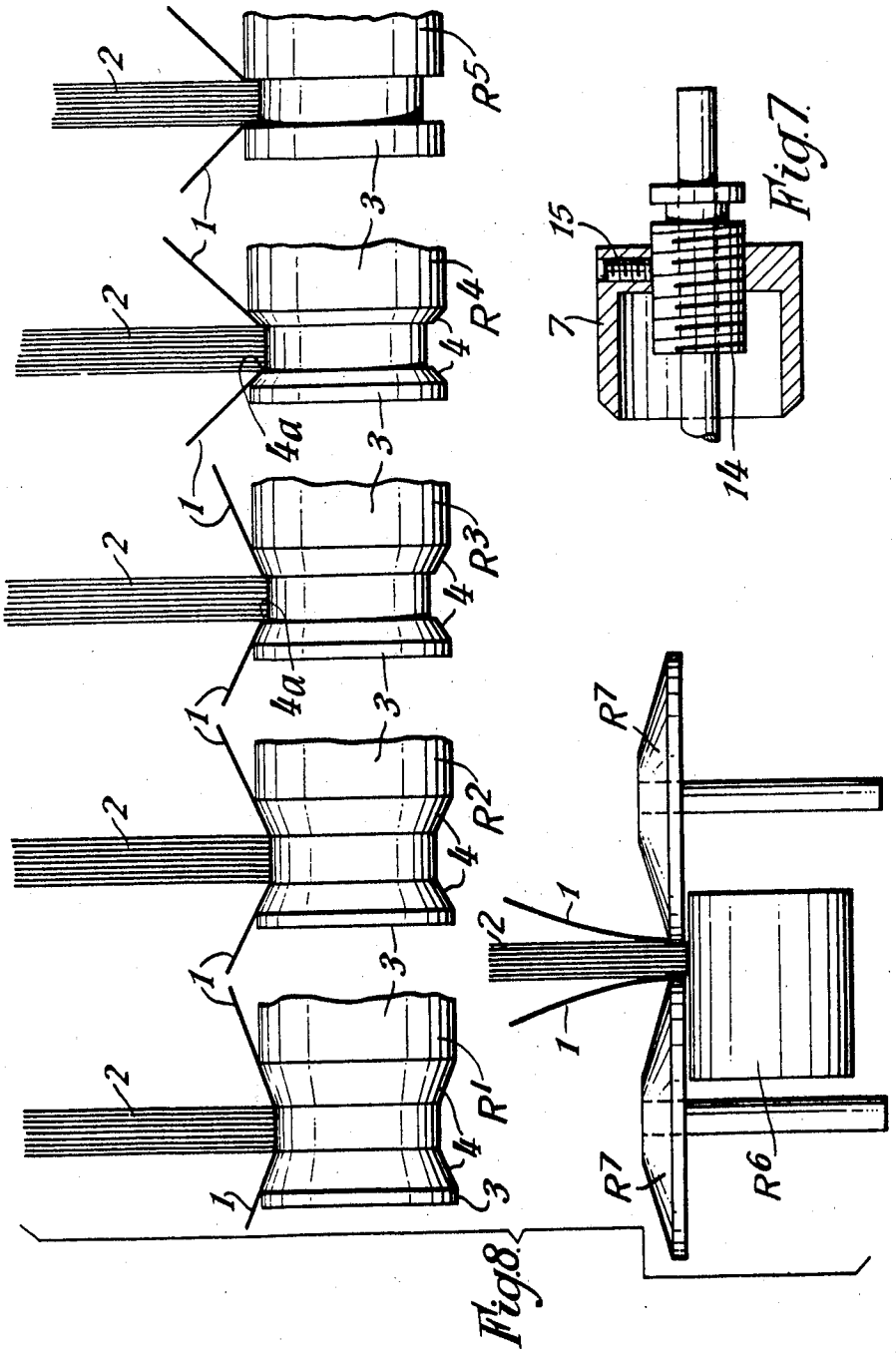


Fig.8

Fig.7

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3,466,682

BOOKBINDING MACHINERY

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Filed Oct. 18, 1967, Ser. No. 676,255
Claims priority, application Great Britain, Nov. 2, 1966, 49,138/66
Int. Cl. B42c *19/00*
U.S. Cl. 11—1 4 Claims

ABSTRACT OF THE DISCLOSURE

A series of rollers are provided in a bookbinding machine and over which the book and cover thereof are passed, backwards, the rollers being arranged to successively and progressively shape the cover around the back of the book and press the cover into adhesive contact with the back. In one embodiment two sets of rollers are provided, one set having each roller formed with annular rims having inclined faces, the angularity of which is progressively increased to gradually bend the cover around the corners of the back. In a further embodiment some of the said one set of rollers are formed with a channel to allow the cover to be gripped and producing a correspondingly shaped channel on the cover to trap the adhesive. In a further feature of the invention the distance separating the rollers is adjustable to accommodate books of different thicknesses and the rollers are adjustable to vary the pressure exerted by the rollers on the cover and back of the book.

This invention relates to bookbinding machinery and is primarily concerned with the application of the paper covers to books commonly known in the trade as "paperbacks," such books being usually flat back books which are finished with a light card or heavy paper cover, the cover being glued to the back of the book and usually for a short distance up the front and back end sheets. Among the objects of the invention is to provide a machine for the binding of covers, particular paperback covers, to the adhesive-coated spines or backs of books.

Machines have been in use for many years for this process and consist usually of a series of clamps to hold the books firmly back downwards, means for applying a coat of glue to the back, means for feeding the cover in correct relationship to the glued back and applying it to the book and, finally, means for shaping the cover round the corners of the spine after it has been applied.

When intermittent motion is applied to the clamps shaping of the cover round the back of the book is usually formed by a plate which rises to press the cover firmly against the glued back of the book and two plates one on either side of the book which then close in momentarily to fold the cover round the back and sharply over the corners of the spine, such devices are comparatively simple in design and operation.

Where the clamps are in continuous motion the operation of shaping the cover round the back of the book must be performed by an apparatus which carries out these operations while the book is in motion. Varying means are used for this but basically all operate on the same principle of first bringing a plate up against the back of the book and then closing-in two additional plates one on either side. In all cases the apparatus used is necessarily somewhat complicated since it must be easily adjustable for various thicknesses of books and in addition must be robust enough not only to support the normal strains imposed but to allow for mishaps such as the feeding of two covers instead of one which would impose extra strain.

The chief object of the present invention is to evolve improved cover applying mechanism which will be cheap to manufacture, will be particularly efficient in use and will avoid the use of reciprocating plates or similar means.

The invention consists broadly in the provision of a series of rollers over which the book and its associated cover is passed back downwards, which rollers successively and progressively shape the cover around the book back.

The rollers may be driven but preferably are revolved by the passage of the book and its associated cover over the rollers.

It is preferred to employ two sets of rollers, one set engaging the cover to press it firmly into contact with the book back and bend the cover around the two corners of the back, this set of rollers revolving about horizontal axes, the second set revolving about vertical axes and serving to grip the opposite faces of the cover with the book therebetween adjacent the corners so that the front and back parts of the cover will be pressed firmly into contact with the glued front and back end sheets.

According to a further feature of the invention the rollers comprising the first set are each formed with annular rims at their ends having inclined faces, the angularity of the faces being progressively increased throughout the set so that the cover is gradually bent around the corners of the back.

Referring to the accompanying drawings:

FIGURE 1 is a perspective view diagramatically illustrating the main components of the device and the method of operation;

FIGURE 2 is a side elevation of the device;

FIGURE 3 is a plan view;

FIGURES 4 and 5 are sections taken through one of the rimmed rollers and the plain roller respectively;

FIGURE 6 is an end elevation looking from the right hand end of FIGURE 2;

FIGURE 7 is a scrap section showing an alternative method of adjusting the effective width of the roller rims; and

FIGURE 8 is a composite view illustrating the different formation of the various rollers and the progressive bending of the cover around the book back.

The invention as now described is applied to a self-contained device for bending an applied cover around the corners of a book back.

As shown clearly in FIGURES 1 and 8 the book with the cover attached to the freshly glued spine is passed through the machine in the direction of the arrow in FIGURE 1, adhesive having been applied to the book spine and over that part of the end papers lying close to the corners of the book back. The books passing through the book binding machine are suspended spine downwards between clamps, the cover being applied to the freshly glued back by a raisable platform or other device forming no part of the present invention, movement of the books through the machine being preferably but not necessarily continuous, the books being fed forwardly either by hand or by a suitable conveyor type device.

The device includes a first series of rollers indicated by reference numerals R^1, R^2, R^3, R^4 R^5 and R^6 which bend the front and back portions of the cover **1** around the corners of the back of the book **2** with the exception of roller R^6, which is a plain roller and merely supports the book during the final pressing of the front and back portions of the cover into contact with the adhesive coated parts of the end papers by means of a second set of rollers R^7, this second set of rollers R^7 in conjunction with plain roller R^6 ensuring that the covered book has sharp and well defined corners.

Rollers R^1–R^5 have laterally spaced rims **3** formed with inner faces **4**, the angularity of the faces of rollers R^1–R^4 being gradually increased, the faces of roller R^5 lying at right angles to the axis of rotation.

In addition to the inclined faces **4**, in the case of rollers R^3 and R^4, these rollers are formed with a channel **4***a* approximately one sixteenth of an inch deep having parallel sides which lead to the inclined faces, the distance separating the parallel sides being the same as the thickness of the book and its associated cover, the channel **4***a* forming a channel in the cover in which the adhesive is trapped.

In this way the front and back portions of the cover are gradually bent around the corners of the book back until they contact the adhesive coated parts of the end pages, the cover and book being finally squeezed between rollers R^7, the trapped adhesive during the final cover forming operation being compressed and forced between the fibres of the paper to ensure a good stick.

The device includes a channel-section frame **5** (FIG. 4), the flanges of which are bored to receive the fixed spindles **36** on which rollers R^1–R^5 revolve.

Rollers R^1–R^5 are each constructed as two coaxially arranged parts **6** and **7** which are movable towards or away from each other to vary the distance separating the inclined faces **4** to suit the thickness of book being covered.

Part **6** is located in position upon its associated spindle by a clip **8** while part **7** is located in position by resting in a U-shaped slot **9** in a stock plate **10** carried by an adjusting nut **11** and associated transverse slide, the nut **11** being entered by an adjusting screw **12** having a knurled head **13**, the adjusting screw revolving in a bearing in the adjacent flange of the frame **5**.

Two such nuts **11** are associated with opposite ends of the stock plate **10** whereby adjustment of the knurled heads **13** will move the parts **7** of the rollers R^1–R^5 simultaneously relative to parts **6**.

If individual adjustment of the rollers is necessary or desirable a construction such as is shown in FIGURE 7 may be adopted. In this case part **7** is in threaded connection with a boss **14** on the spindle, so that relative turning movement will move part **7** laterally, part **7** being locked after adjustment by tightening set screw **15**.

Adjustment of the knurled heads **13** will also move rollers R^7 towards or away from each other to suit the thickness of book being covered. Rollers R^7 revolve about vertical axes and are carried by spindles **16** revolving in bearings in blocks **17** hinged at **18** respectively to a side flange of the frame and stock plate **10**. Angular adjustment of each roller carrying block **17** is effected by an adjusting screw **19**. In this way each roller R^7 may be moved inwardly and outwardly individually and jointly by adjustment of the knurled heads **13**.

Plain roller R^6 requires no lateral adjustment and consequently is merely freely revolvable on a spindle **20** carried by one of the frame flanges.

The effect of the R^1 to R^5 is that as the book with the cover attached to it by the glue on the spine is carried over the same, the cover is gradually formed up to the desired shape to closely fit the back and a short section of each side of the book. The rollers R^7, mounted on vertical spindles then are able to sharpen the corner of

the cover around the corner of the spine of the book to give an eventual result equal if not better than that produced by the more usual devices, consisting of an upward lifting plate with two side forming plates.

If desired the adjusting screws **12** may be simultaneously rotated by a chain coupling passing around sprocket wheels carried by the two adjusting screws or the screws may be connected by gearing.

To enable the whole unit to be moved vertically to increase or decrease the pressure exerted by the rollers R^1–R^6 on the cover and book back or to move the rollers out of operation if necessary the unit may be supported at its opposite ends on tubular eccentric shafts **21** shown in FIGURE 6 through each of which is passed a spindle **22** carried by a fixed flange **22***a* of the machine. The eccentric shafts pass through borings in webs **23** on the frame **1** and can be locked in any angular position by locking screws **24**.

The extremity of each spindle **22** is threaded to receive an adjusting nut **25** by which the whole unit can be moved laterally against the pressure exerted by coil springs **26**.

It will be appreciated therefore that the unit can be moved bodily sideways to bring it into correct alignment with the books, can be raised or lowered whilst the effective separating distance of the cover engaging parts of the rollers can be quickly and easily adjusted.

I claim:

1. In a book binding machine, means for completing the binding of covers on the spines of the books comprising

a first set of at least four rollers mounted in series for revolution about horizontal axes, and a second set of rollers comprising a pair of rollers mounted for rotation about a vertical axis,

(1) said first set of at least four rollers comprising

(a) a first roller having spaced rims forming a flat central portion of approximately the width of the spine of the book to be covered and has faces forming walls sloping inwardly from the rims thereof down to the flat central portion,

(b) the penultimate roller having a spaced rim forming a flat central portion with substantially vertical side walls, the contours of the side walls of the rollers preceding the penultimate roller, gradually increasing in angularity up to said vertical walls,

(c) the final roller of said set having a plain surface,

(2) said second pair of rollers being mounted on vertical axes on opposite sides of the final roller of the first set and having their adjoining peripheries spaced so as to press against the sides of a book with covered spine thereof resting on the surface of the final roller of the first set,

whereby when an adhesively coated book spine with its cover is passed over said first series of rollers, the cover is gradually bent about the body of the book by the first set of rollers, and the adhesive is trapped and driven toward the back portion of the book by the second set of rollers.

2. The book binding machine as claimed in claim **1**, wherein an intermediate one of the first set of rollers has spaced rims forming a flat central portion of approximately the width of the spine of the book to be covered, and has sloping walls extending from the rims toward the flat central portion but ending in substantially vertical walls forming a shallow channel with the flat central portion, whereby to trap a quantity of adhesive between the spine of the book and its cover.

3. The book binding machine as claimed in claim **1**, each of said rimmed rollers of said first set having an ad-

justable rim whereby the width of the flat central portion can be adjusted for different sized books.

4. The book binding machine as claimed in claim 1, each of said rimmed rollers of said first set having an adjustable rim, said vertical axes of said second set of rollers being adjustable toward and away from each other, and

means to simultaneously adjust the rims of all of the rimmed rollers and the axes of the second set of rollers.

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